

SOUTH DAKOTA STATEWIDE FISHERIES SURVEY

2102-F-21-R-43

Name: Brant Lake

County: Lake

Legal Description: T105N- R51W-Sec. 3, 4, 9, 10

Location from nearest town: 2 miles north of Chester, SD

Dates of present survey: July 19-21, 2010 (netting); Sept. 10, 2010 (electrofishing)

Dates of last survey: July 20-22, 2009 (netting); Sept. 1, 2009 (electrofishing)

Managed Species	Other Species
Walleye	Northern Pike
Smallmouth Bass	Bluegill
Yellow Perch	Black Bullhead
Black Crappie	Channel Catfish
Bigmouth Buffalo	White Sucker
Common Carp	Spottail Shiner
	Green Sunfish
	Hybrid Sunfish
	White Bass

PHYSICAL DATA

Surface area: 1,037 acres

Maximum depth: 14 feet

Volume: 11,000 acre-feet

Contour map available: Yes

OHWM elevation: 1598.3

Outlet elevation: 1597.3

Lake elevation observed during the survey: Full

Beneficial use classifications: (4) warmwater permanent fish life propagation, (7) immersion recreation, (8) limited contact recreation and (9) wildlife propagation and stock watering.

Watershed area: 7,658 acres

Mean depth: 11 feet

Shoreline length: 6.2 miles

Date mapped: November, 2002

Date set: December, 1981

Date set: February, 1987

Introduction

Brant Lake, located just north of Chester, is last in a chain of four natural lakes formed by receding glaciers at the end of the last ice age. It derived its name from the large number of white brant (snow geese) that occupy the area during the spring and fall migrations. Brant receives most of its water from lakes Herman, Madison and Round, the upper three lakes in the chain, via Silver Creek. Additional inputs come from the relatively small, local watershed. Outflows form the headwaters of Skunk Creek, which flows into the Big Sioux River in Sioux Falls.

Ownership of Lake and Adjacent Lakeshore Properties

Brant Lake is listed as meandered public water in the State of South Dakota Listing of Meandered Lakes and the South Dakota Department of Game, Fish and Parks (GFP) manages the fishery. GFP also owns and maintains access areas on the east, south, and west sides of the lake. The remainder of the shoreline property is privately owned.

Fishing Access

The East Brant Access Area has a double lane boat ramp, dock and large parking lot. The West Brant Access Area has a new double lane boat ramp with a large parking lot and several shore fishing areas. The South Brant Access Area also offers shore fishing opportunities.

Field Observations of Water Quality and Aquatic Vegetation:

In spite of a moderate algae bloom, water clarity was good this year with a Secchi depth measurement of 1.8 m (72 in). Scattered, sparse beds of sago pondweed (*Potamogeton pectinatus*) were found throughout the lake and cattails (*Typha spp.*) were observed at the west end.

BIOLOGICAL DATA

Methods:

Brant Lake was sampled on July 19-21, 2010 with five overnight gill-net sets and 12 overnight trap-net sets. The trap nets are constructed with 19-mm-bar-mesh ($\frac{3}{4}$ in) netting, 0.9 m high x 1.5 m wide (3 ft high x 5 ft wide) frames and 18.3 m (60 ft) long leads. The gill nets are 45.7 m long x 1.8 m deep (150 ft long x 6 ft deep) with one 7.6 m (25 ft) panel each of 13, 19, 25, 32, 38 and 51-mm-bar-mesh ($\frac{1}{2}$, $\frac{3}{4}$, 1, $1\frac{1}{4}$, $1\frac{1}{2}$, and 2 in) monofilament netting. Two hours of nighttime electrofishing were done on September 10, 2010 to evaluate walleye recruitment. Sampling locations are displayed in Figure 8.

Results and Discussion:

Gill Net Catch

Yellow perch (48.0%), walleye (14.6%), and white sucker (9.7%) were the most abundant species sampled in the gill nets (Table 1). Ten additional species were also sampled. Six species were represented by less than ten individuals.

Table 1. Total catch from five overnight gill-net sets at Brant Lake, Lake County July 19-21, 2010.

Species	#	%	CPUE ¹	80% C.I.	Mean CPUE*	PSD	RSD-P	Mean Wr
Yellow Perch	177	48.0	35.4	<u>+13.5</u>	40.0	68	53	95
Walleye	54	14.6	10.8	<u>+3.6</u>	14.5	15	3	87
White Sucker	36	9.7	7.2	<u>+2.8</u>	7.2	92	81	96
Black Bullhead	25	6.7	5.0	<u>+1.3</u>	6.3	73	32	101
Bigmouth Buffalo	22	5.9	4.4	<u>+3.5</u>	3.1	100	5	91
Smallmouth Bass	21	5.7	4.2	<u>+3.6</u>	5.1	75	44	89
Spottail Shiner	11	3.0	2.2	<u>+1.8</u>	0.6	--	--	--
Northern Pike	9	2.4	1.8	<u>+0.5</u>	0.6	--	--	--
Common Carp	6	1.6	1.2	<u>+1.5</u>	1.1	--	--	--
White Bass	4	1.1	0.8	<u>+0.3</u>	1.9	--	--	--
Orange-Spotted Sunfish	3	0.8	0.6	<u>+0.3</u>	0.0	--	--	--
Black Crappie	2	0.5	0.4	<u>+0.3</u>	2.5	--	--	--
Bluegill	1	0.3	0.2	<u>+0.3</u>	0.6	--	--	--

* (10 years) 2000-2009

Table 2. Catch per unit effort by length category for various fish species captured with gill nets in Brant Lake July 19-21, 2010.

Species	Substock	Stock	S-Q	Q-P	P+	All sizes	80% C.I.
Yellow Perch	--	35.4	11.2	5.4	18.8	35.4	<u>+13.5</u>
Walleye	2.8	8.0	6.8	1.0	0.2	10.8	<u>+3.6</u>
White Sucker	--	7.2	0.6	0.8	5.6	7.2	<u>+2.8</u>
Black Bullhead	0.6	4.4	1.2	1.8	1.4	5.0	<u>+1.3</u>
Bigmouth Buffalo	--	4.4	--	4.2	0.2	4.4	<u>+3.5</u>
Smallmouth Bass	1.0	3.2	0.8	1.0	1.4	4.2	<u>+3.6</u>
Spottail Shiner*	--	--	--	--	--	2.2	<u>+1.8</u>
Northern Pike	0.4	1.4	1.2	0.2	--	1.8	<u>+0.5</u>
Common Carp	--	1.2	0.4	0.2	0.6	1.2	<u>+1.5</u>
White Bass	--	0.8	--	--	0.8	0.8	<u>+0.3</u>
Orange-Spotted Sunfish*	--	--	--	--	--	0.6	<u>+0.3</u>
Black Crappie	--	0.4	--	--	0.4	0.4	<u>+0.3</u>
Bluegill	--	0.2	--	--	0.2	0.2	<u>+0.3</u>

*No length categories established. Length categories can be found in Appendix A.

Trap Net Catch

Black crappie (12.6%) was the most abundant species in the trap-net catch (Table 3). Northern pike and yellow perch were tied for second (12.2%) in abundance. Nine other species were also sampled.

¹ See Appendix A for definitions of CPUE, PSD, RSD-P, and mean Wr.

Table 3. Total catch from 12 overnight trap-net sets at Brant Lake, Lake County July 19-21, 2010.

Species	#	%	CPUE	80% C.I.	Mean CPUE*	PSD	RSD-P	Mean Wr
Black Crappie	62	12.6	5.2	<u>+2.9</u>	8.9	100	100	102
Northern Pike	60	12.2	5.0	<u>+1.9</u>	0.9	37	4	84
Yellow Perch	60	12.2	5.0	<u>+2.2</u>	4.3	83	77	102
Black Bullhead	58	11.8	4.8	<u>+2.0</u>	24.6	77	27	93
Bigmouth Buffalo	53	10.8	4.4	<u>+2.0</u>	4.7	93	7	92
White Sucker	47	9.6	3.9	<u>+1.0</u>	7.1	91	72	95
Common Carp	44	8.9	3.7	<u>+1.3</u>	5.4	24	17	98
Bluegill	38	7.7	3.2	<u>+1.6</u>	5.2	97	84	110
Walleye	33	6.7	2.8	<u>+2.5</u>	1.4	15	4	89
Smallmouth Bass	24	4.9	2.0	<u>+0.8</u>	13.2	42	5	94
White Bass	11	2.2	0.9	<u>+0.7</u>	0.2	100	91	94
Channel Catfish	2	0.4	0.2	<u>+0.1</u>	0.6	--	--	--

* (10 years) 2000-2009

Table 4. Catch per unit effort by length category for various fish species captured with trap nets in Brant Lake July 20-22, 2010.

Species	Substock	Stock	S-Q	Q-P	P+	All sizes	80% C.I.
Black Crappie	--	5.2	--	--	5.2	5.2	<u>+2.9</u>
Northern Pike	0.2	4.8	3.1	1.6	0.1	5.0	<u>+1.9</u>
Yellow Perch	--	5.0	0.8	0.3	3.9	5.0	<u>+2.2</u>
Black Bullhead	0.2	4.7	1.1	2.3	1.3	4.8	<u>+2.0</u>
Bigmouth Buffalo	--	4.4	0.3	3.8	0.3	4.4	<u>+2.0</u>
White Sucker	--	3.9	0.3	0.8	2.8	3.9	<u>+1.0</u>
Common Carp	0.2	3.5	2.7	0.3	0.6	3.7	<u>+1.3</u>
Bluegill	--	3.2	0.1	0.4	2.7	3.2	<u>+1.6</u>
Walleye	0.6	2.2	1.8	0.3	0.1	2.8	<u>+2.5</u>
Smallmouth Bass	0.4	1.6	0.9	0.6	0.1	2.0	<u>+0.8</u>
White Bass	--	0.9	--	0.1	0.8	0.9	<u>+0.7</u>
Channel Catfish	--	0.2	0.1	--	0.1	0.2	<u>+0.1</u>

Length categories can be found in Appendix A.

Walleye

Management objective: Maintain a walleye population with a gill-net CPUE of at least 20, a PSD range of 30-60, and a growth rate of 356 mm (14 inches) by age-3.

Walleye gill-net CPUE increased slightly, but was still below average and remains well below the management objective (Table 5). Sampled walleyes ranged in length from 110 mm to 586 mm (4.3 – 23.1 in) with an average of 306 mm (12.0 in) (Figure 1). Growth rates were average (Table 6) and condition (Wr) was above the ten-year mean (Table 5).

Table 5. Walleye gill-net CPUE, PSD, RSD-P, and mean Wr for Brant Lake, Lake County, 2001-2010.

	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	Mean*
CPUE	20.5	20.7	12.8	12.3	8.5	12.5	20.0	9.2	7.4	10.8	14.5
PSD	38	82	13	4	59	44	28	16	13	15	31
RSD-P	4	0	6	2	0	5	13	7	6	3	4
Mean Wr	93	83	81	86	84	85	86	83	81	87	85

*10 years (2000-2009)

Table 6. Weighted mean length at capture (mm) for walleye captured in gill nets in Brant Lake, Lake County, 2003-2010. Note: sampling was conducted at approximately the same time during each year allowing comparisons among years to monitor growth trends. Sample size in parentheses.

Year	1	2	3	4	5	6	7	8	9	10	11	12
2010 (53)	249 (25)	334 (12)	372 (15)	--	--	--	--	586 (1)	--	--	--	--
2009 (37)	220 (6)	301 (25)	389 (4)	--	--	572 (1)	--	--	--	727 (1)	--	--
2008 (55)	243 (18)	332 (30)	419 (3)	--	--	--	535 (1)	--	644 (2)	--	485 (1)	--
2007 (80)	241 (40)	343 (25)	379 (3)	453 (3)	478 (3)	545 (1)	611 (3)	686 (2)	--	--	--	--
2006 (50)	258 (26)	257 (2)	394 (6)	417 (7)	442 (6)	478 (1)	500 (1)	--	692 (1)	--	--	--
2005 (34)	--	363 (12)	391 (10)	415 (12)	--	--	--	--	--	--	--	--
2004 (49)	258 (14)	303 (9)	331 (25)	--	--	532 (1)	--	--	--	--	--	--
2003 (64)	221 (8)	271 (46)	330 (3)	429 (1)	500 (2)	503 (1)	542 (1)	562 (2)	--	--	--	--

Electrofishing indicated that a strong walleye year class was produced on Brant Lake this year (Table 7). Although walleyes were not stocked into Brant this year, samples were examined for OTC marks because age-0 walleyes stocked into Madison migrated to Brant in 2005, another year where heavy summer precipitation kept the lakes connected throughout the summer. All samples exhibited fingerling marks demonstrating that Madison-stocked fingerlings had indeed produced the large year class. The crew forgot to sample age-1 walleyes so yearling numbers were not estimated. However, a gill-net CPUE of 5 yearling walleyes was recorded during the summer survey with fish averaging about 250 mm or 10 inches long (Table 6).

Table 7. Age-0 and age-1 walleyes sampled during 2 hours of nighttime electrofishing on Brant Lake, Lake County, 1996-2010.

Year	Stocking	Age-0 CPH	80% C.I.	% stocked	Mean length (range; mm)	Wr	Age-1 CPH	80% C.I.	Mean length (range; mm)	Wr
2010	none	133	104-162	100 ²	208 (171-236)	92	³			
2009	fingerling	111	82-140	84	151 (129-170)	87	11	3-19	274 (234-300)	86
2008	none	3	1-5		165 (152-186)	82	39	24-54	264 (228-297)	86
2007	none	40	22-68		188 (156-212)	93	9	5-13	290 (252-310)	89
2006	fingerling	124	98-150	73	170 (136-188)	90	11	4-18	290 (255-324)	88
2005	fry	62 ¹	51-73	45	174 (138-209)	94	0	--	--	--
2004	none	0	--		--	--	2	0-3	266 (236-288)	89
2003	none	20	14-26		176 (156-181)	101	8	6-10	265 (228-274)	89
2002	none	42	21-63		164 (140-183)	98	166	112-219	248 (208-268)	86
2001	none	84	49-118		154 (131-198)	86	1	0-2	319	
2000	none	24	18-30		184 (161-217)	101	5	3-7	295 (269-305)	101
1999	none	86			162 (140-217)		35			
1998	fry	176		98	137 (116-132)		23			
1997	fry	178		93	124 (102-190)		58			
1996	fry	79		92	137 (116-186)		34			

¹ OTC marking revealed that 50% of the age-0 walleyes electrofished from Brant Lake were 2005 fingerling-stocked Lake Madison walleyes that had migrated downstream with the late-summer, high-water conditions (fish exhibited bright fingerling marks).

² OTC marking revealed that 100% of the age-0 walleyes electrofished from Brant Lake were 2010 fingerling-stocked Lake Madison walleyes that had migrated downstream with the summer, high-water conditions (fish exhibited fingerling marks).

³ The electrofishing crew forgot to sample age-1 walleyes.

Yellow Perch

Management objective: Maintain a yellow perch population with a gill-net CPUE of at least 30 and a PSD range of 30-60.

Yellow perch gill-net CPUE increased in 2010 and exceeds the management objective (Table 8). The size structure of the population is excellent (Figure 2), the fish are in good condition (Table 8) and growth remains within previously observed ranges (Table 9). Some natural reproduction is occurring annually, but a strong year class has not been produced since 2001. OTC-marked yellow perch fingerlings (103,540) were stocked in July 2008 and over five million yellow perch fry were stocked in 2009. Evaluation of these stockings is ongoing.

Table 8. Yellow perch gill-net CPUE, PSD, and mean Wr for Brant Lake, Lake County, 2001-2010.

	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	Mean*
CPUE	42.8	124.7	76.6	50.0	28.3	18.0	4.0	15.0	12.4	35.4	40.0
PSD	8	93	94	98	63	60	56	47	87	68	69
RSD-P	0	3	15	86	53	39	13	34	11	53	28
Mean Wr	93	99	101	102	102	103	104	104	103	95	102

*10 years (2000-2009)

Table 9. Weighted mean length at capture (mm) for yellow perch captured in gill nets in Brant Lake, Lake County, 2003-2010. Note: sampling was conducted at approximately the same time during each year allowing comparisons among years to monitor growth trends. Sample size in parentheses.

Year	1	2	3	4	5	6	7	8
2010 (177)	158 (56)	230 (21)	265 (94)	311 (2)	307 (4)	--	--	--
2009 (61)	161 (2)	220 (53)	270 (3)	303 (3)	--	--	--	--
2008 (90)	150 (45)	228 (16)	276 (27)	240 (2)	--	--	--	--
2007 (16)	167 (4)	199 (6)	248 (6)	--	--	--	--	--
2006 (72)	180 (32)	238 (10)	259 (7)	262 (1)	291 (18)	295 (4)	--	--
2005 (107)	164 (38)	239 (9)	243 (3)	276 (42)	280 (15)	--	--	--
2004 (200)	164 (4)	221 (2)	262 (188)	260 (6)	--	--	--	--
2003 (383)	--	225 (205)	231 (130)	242 (32)	274 (12)	272 (4)	--	--

Smallmouth Bass

Management objective: No management objective has been established.

Smallmouth bass trap-net CPUE was similar to last year (Table 10). The 2010 sample was comprised of fish ranging from 14-35 cm (5.5-13.8 in) long (Figure 3) with an average length of 25 cm (9.8 in). Condition (Wr) was below average (Table 10), but higher than the last two years.

Table 10. Smallmouth bass trap-net CPUE, PSD, RSD-P, and mean Wr from Brant Lake, Lake County, 2001-2010.

	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	Mean*
CPUE	14.0	22.0	5.0	8.7	2.6	51.5	17.4	4.3	1.9	2.0	13.2
PSD	35	5	6	19	42	10	10	39	26	42	20
RSD-P	8	0	0	1	17	5	3	4	4	5	4
Mean Wr	103	118	94	103	102	93	98	85	88	94	99

*10 years (2000-2009)

Black Crappie

Management objective: Maintain a black crappie population with a trap-net CPUE of at least 10 and a PSD of at least 60.

Black crappie trap-net CPUE decreased slightly in 2010 and is still below the 10-year mean (Table 11) and the management objective. The crappies sampled were 25-30 cm (10 - 12.0 in) long (Figure 4) with an average length of 265 mm (10.4 in). Most of the fish were age-3, which were also the youngest fish sampled (Table 12). Growth is excellent with fish approaching 254 mm (10 in) by age-3.

Table 11. Black crappie trap-net CPUE, PSD, RSD-P, and mean Wr from Brant Lake, Lake County, 2001-2010.

	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	Mean*
CPUE	8.1	11.8	23.2	3.9	8.8	9.8	5.8	7.6	5.8	5.1	8.9
PSD	97	81	100	100	35	76	94	89	93	100	87
RSD-P	23	0	25	98	26	32	21	40	22	100	32
Mean Wr	121	113	104	99	116	110	109	104	105	102	110

*10 years (2000-2009)

Table 12. Average back-calculated lengths (mm) for each age class of black crappie in Brant Lake, Lake County, 2010.

Year Class	Age	N	Back-calculation Age							
			1	2	3	4	5	6	7	8
2007	3	54	92	191	246					
2006	4	7	95	196	248	271				
2005	5	1	99	202	252	276	296			
All Classes		314	96	196	248	273	296			
Statewide Mean			83	147	195	229	249			
Region III Mean			95	167	219	253	274			
SLI* Mean			89	161	210	247	271			

All Species

Spottail shiner CPUE was the highest recorded since 2002 (Table 13). CPUE for all other species was within previously observed ranges.

Table 13. Gill-net (GN) and trap-net (TN) CPUE for all fish species sampled in Brant Lake, Lake County, 2001-2010.

Species	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
SPS (GN)	0.3	2.3	--	0.3	--	0.8	--	0.8	0.4	2.2
SPS (TN)	--	--	--	--	--	--	--	--	--	--
COC (GN)	0.5	--	1.2	0.3	2.5	0.3	2.5	1.0	0.2	1.2
COC (TN)	1.2	7.7	2.2	17.8	4.8	3.5	6.2	3.4	2.6	3.7
WHS (GN)	6.0	4.3	10.6	17.0	8.5	8.8	5.5	4.2	3.4	7.2
WHS (TN)	2.6	5.1	3.5	4.5	45.1	7.1	0.8	0.2	1.5	3.9
BIB (GN)	--	--	0.2	--	3.3	19.3	3.5	1.0	4.0	4.4
BIB (TN)	1.8	3.9	1.5	0.2	0.3	22.0	3.0	7.8	6.5	4.4
BLB (GN)	0.5	6.0	17.2	5.0	9.0	12.5	2.0	4.5	4.8	5.0
BLB (TN)	6.0	15.0	147.5	11.3	9.1	27.0	4.8	11.9	10.4	4.8
CCF (GN)	--	--	1.2	1.5	2.0	--	--	0.2	0.2	--
CCF (TN)	--	--	2.6	0.6	0.3	0.5	1.1	0.3	--	0.2
NOP (GN)	0.3	1.0	--	0.8	0.3	0.8	1.3	1.0	0.2	1.8
NOP (TN)	0.6	2.1	0.5	0.7	--	0.7	0.9	2.0	0.7	5.0
WHB (GN)	--	--	--	--	0.5	--	0.3	10.5	7.4	0.8
WHB (TN)	0.1	--	--	0.1	--	--	--	1.6	0.3	0.9
GSF (GN)	--	--	0.2	--	--	--	--	--	0.2	--
GSF (TN)	0.1	0.1	--	0.3	--	0.1	--	--	--	--
HYB (GN)	--	--	0.4	--	--	--	--	--	--	--
HYB (TN)	0.7	0.5	0.5	--	--	--	--	0.1	--	--
BLG (GN)	0.3	1.3	0.6	--	0.3	1.3	0.8	1.3	0.2	0.2
BLG (TN)	3.3	8.8	4.4	4.1	6.8	6.9	4.6	9.4	1.9	3.2
SMB (GN)	3.3	7.0	4.4	3.8	3.5	16.3	8.5	2.2	0.2	4.2
SMB (TN)	14.0	22.2	5.0	8.7	2.6	51.5	17.4	4.3	1.9	2.0
BLC (GN)	--	7.7	3.0	2.8	5.3	2.0	0.5	1.8	1.0	0.4
BLC (TN)	8.1	11.8	23.2	3.9	8.8	9.8	5.8	7.6	5.8	5.2
YEP (GN)	42.8	124.7	76.6	50.0	28.3	18.0	4.0	15.0	12.4	35.4
YEP (TN)	17.7	8.5	8.3	0.7	0.2	0.7	0.2	0.3	0.5	5.0
WAE (GN)	20.5	20.7	12.8	12.0	8.5	12.5	20.0	9.2	7.4	10.8
WAE (TN)	3.2	1.5	2.0	2.3	1.1	1.6	0.8	0.9	0.5	2.8

SPS (Spottail Shiner), COC (Common Carp), WHS (White Sucker), BIB (Bigmouth Buffalo), BLB (Black Bullhead), CCF (Channel Catfish), NOP (Northern Pike), WHB (White Bass), GSF (Green Sunfish), HYB (Hybrid Sunfish), BLG (Bluegill), SMB (Smallmouth Bass), BLC (Black Crappie), YEP (Yellow Perch), WAE (Walleye)

MANAGEMENT RECOMMENDATIONS

1. Continue annual netting surveys to monitor the general fish population and annual fall electrofishing surveys to monitor walleye recruitment.
2. Maintain the walleye population by stocking fry or fingerlings when natural reproduction is insufficient to maintain abundance.
3. Stock yellow perch to fill voids of poor reproduction. Develop hatchery production methods to provide large numbers of yellow perch fry and fingerlings for stocking. Fry and fingerling perch should be marked with OTC prior to release. Marked fish will be monitored through annual lake surveys and other methods.
4. Past research has indicated that a lack of wind protected panfish spawning habitat may limit natural reproduction. Investigate the use of artificial structures to enhance spawning habitat and the use of barriers to protect panfish spawning areas from the destructive activities of common carp.
5. The Brant Lake Association has expressed interest in cooperating with GFP to work on habitat projects in the lake. We should develop a preliminary habitat improvement plan that includes Christmas trees for perch spawning and shoreline brush piles for crappie, bass and bluegill benefits.
6. Consider using barriers to keep common carp away from their preferred spawning habitat to limit reproduction and removing age-0 carp to control the carp population.

Table 14. Stocking record for Brant Lake, Lake County, 1997-2010.

Year	Number	Species	Size
1997	1,620	Black Crappie	Adult
	98,700	Bluegill	Fingerling
	1,974,000	Walleye	Fry
	4,024	Yellow Perch	Adult
1998	1,974,000	Walleye	Fry
1999	12,089	Black Crappie	Juvenile
	20,528	Yellow Perch	Juvenile
	8,225	Yellow Perch	Adult
2000	47,044	Yellow Perch	Juvenile
2001	8,992	Yellow Perch	Adult
2002	16,929	Yellow Perch	Juvenile
	700	Yellow Perch	Adult
2004	6,885	Yellow Perch	Fingerling
2005	385,950	Walleye	Fry
2006	104,910	Walleye	Sml. Fingerling
	3,582	Yellow Perch	Fingerling
2007	30,825	Yellow Perch	Fingerling
	4,000	Fathead Minnow	Adult
2008	103,540	Yellow Perch	Fingerling
2009	103,900	Walleye	Sml. Fingerling
	5,254,000	Yellow Perch	Fry

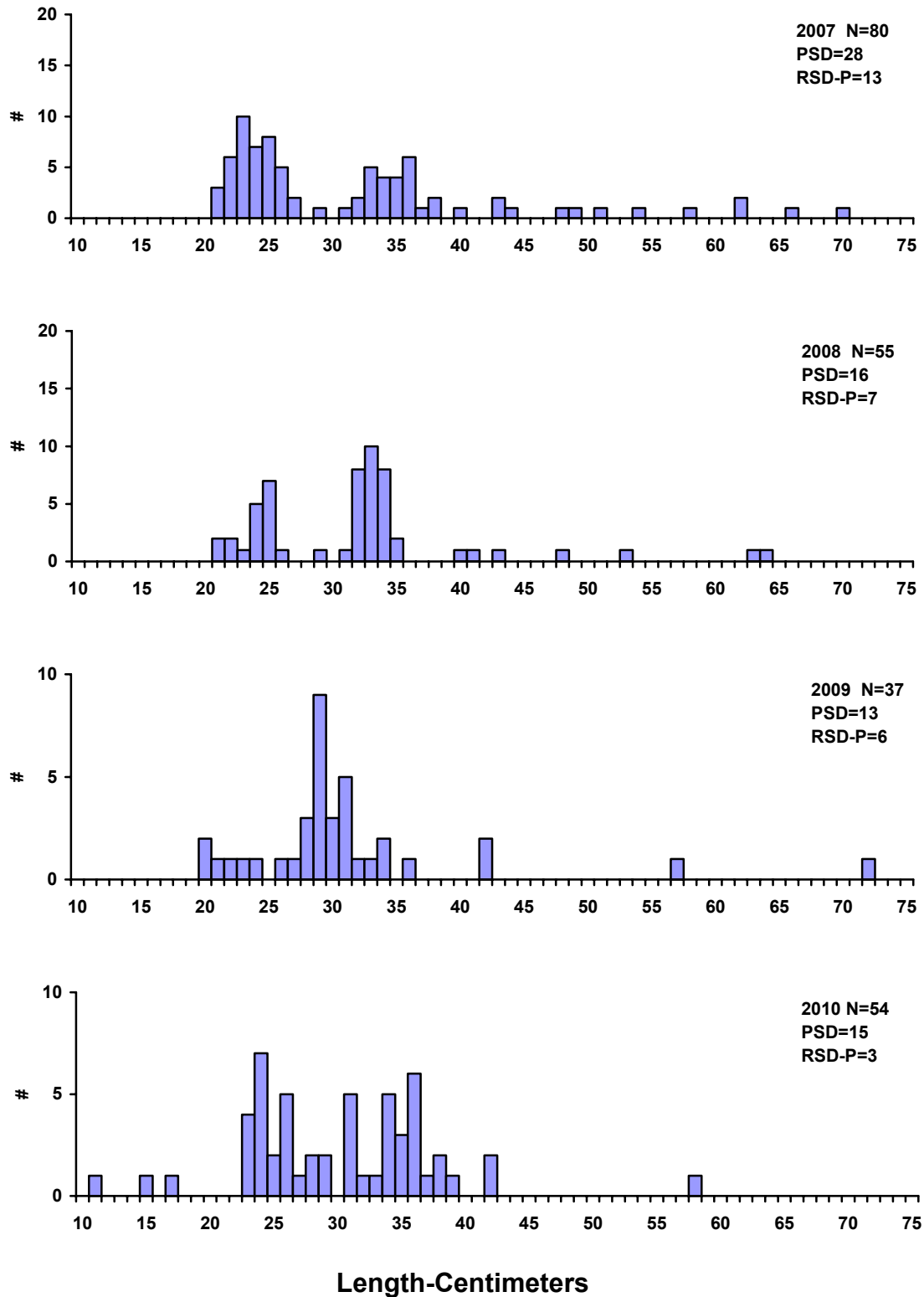


Figure 1. Length frequency histograms for walleyes sampled with gill nets in Brant Lake, Lake County, 2007-2010.

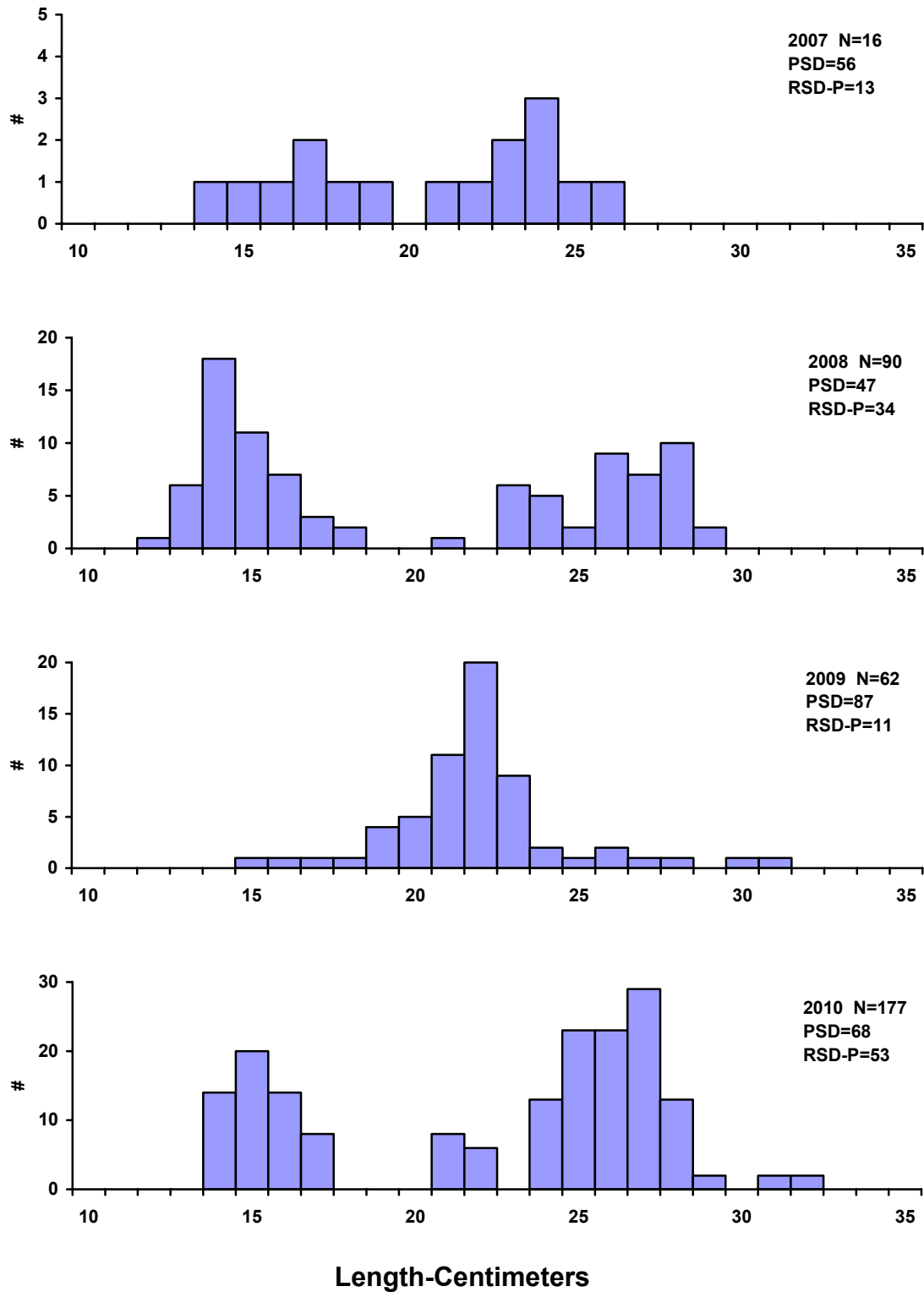


Figure 2. Length frequency histograms for yellow perch sampled in gill nets in Brant Lake, Lake County, 2007-2010.

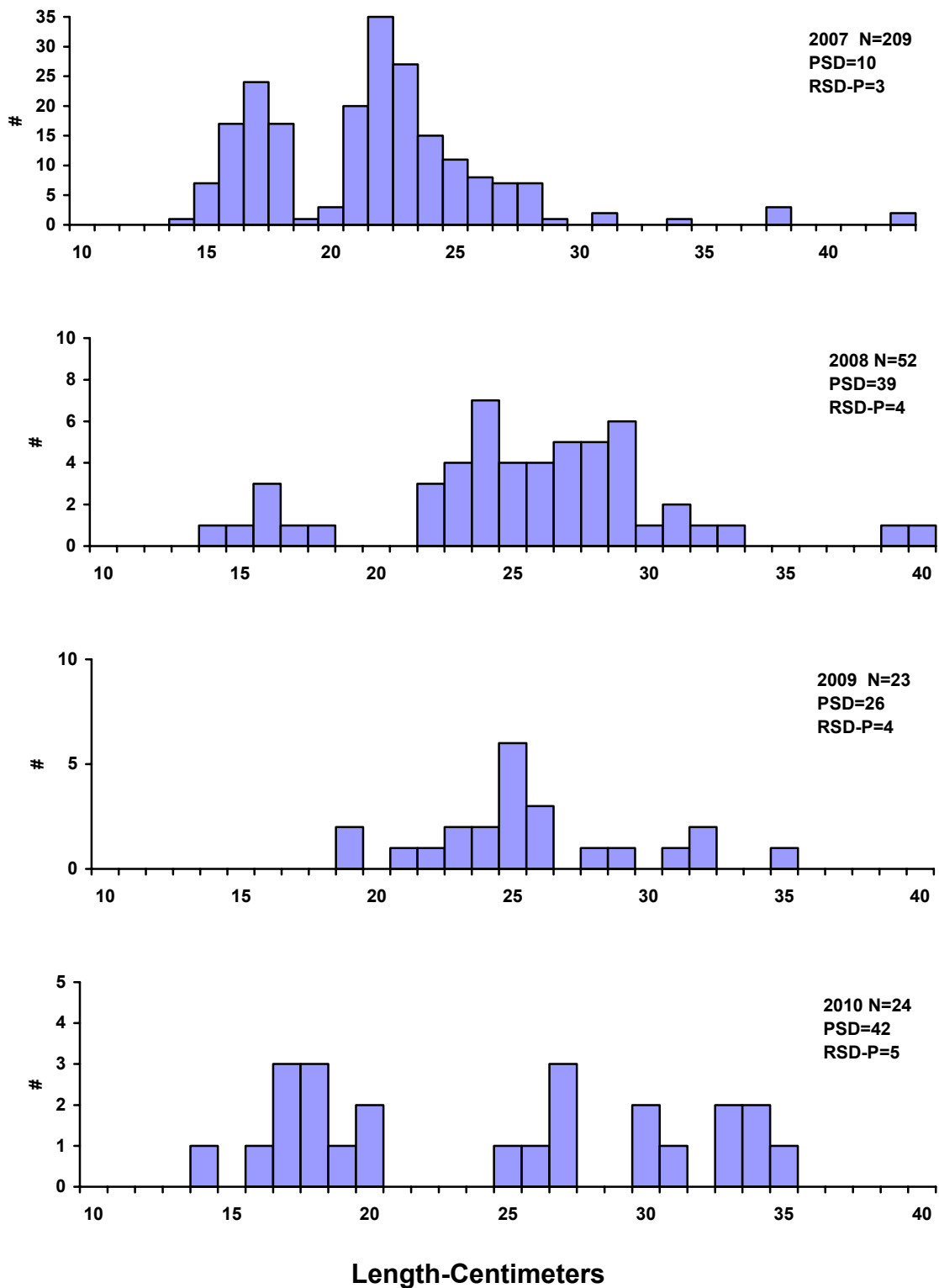


Figure 3. Length frequency histograms for smallmouth bass sampled with trap nets from Brant Lake, Lake County, 2007-2010.

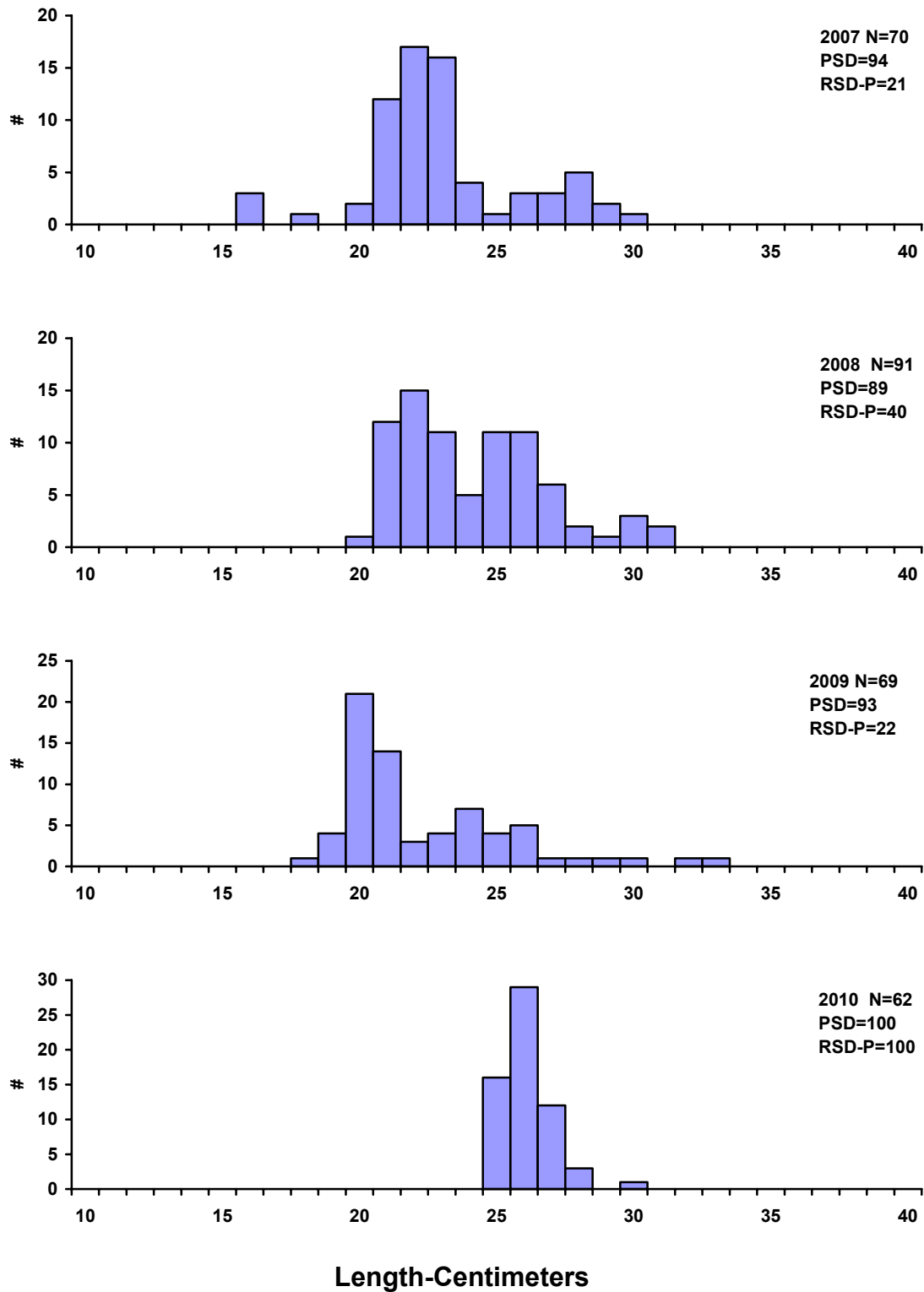


Figure 4. Length frequency histograms for black crappies sampled with trap nets in Brant Lake, Lake County, 2007-2010.

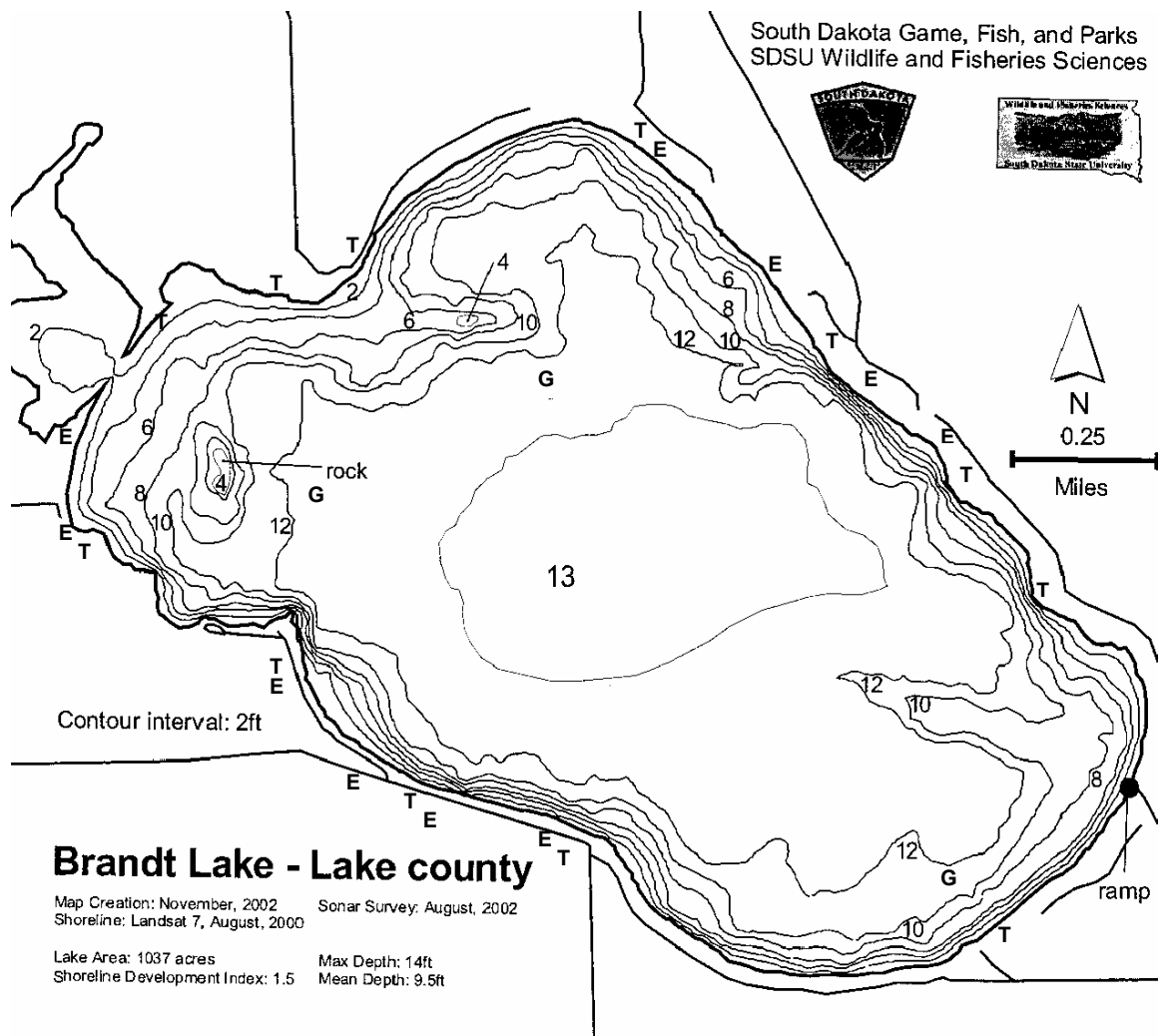


Figure 5. Sampling locations on Brant Lake, Lake County, 2010.

Appendix A. A brief explanation of catch per unit effort (CPUE), proportional stock density (PSD), relative stock density (RSD) and relative weight (Wr).

Catch Per Unit Effort (CPUE) is the catch of animals in numbers or in weight taken by a defined period of effort. Can refer to trap-net nights of effort, gill-net nights of effort, catch per hour of electrofishing, etc.

Proportional Stock Density (PSD) is calculated by the following formula:

$$\text{PSD} = \frac{\text{Number of fish} > \text{quality length}}{\text{Number of fish} \geq \text{stock length}} \times 100$$

Relative Stock Density (RSD-P) is calculated by the following formula:

$$\text{RSD-P} = \frac{\text{Number of fish} > \text{preferred length}}{\text{Number of fish} \geq \text{stock length}} \times 100$$

PSD and RSD-P are unitless and usually calculated to the nearest whole digit.

Size categories for selected species found in Region 3 lake surveys, in centimeters (inches in parenthesis).

Species	Stock	Quality	Preferred	Memorable	Trophy
Walleye	25 (10)	38 (15)	51 (20)	63 (25)	76 (30)
Yellow perch	13 (5)	20 (8)	25 (10)	30 (12)	38 (15)
Black crappie	13 (5)	20 (8)	25(10)	30 (12)	38 (15)
White crappie	13 (5)	20 (8)	25(10)	30 (12)	38 (15)
Bluegill	8 (3)	15 (6)	20 (8)	25 (10)	30 (12)
Largemouth bass	20 (8)	30 (12)	38 (15)	51 (20)	63 (25)
Smallmouth bass	18 (7)	28 (11)	35(14)	43 (17)	51 (20)
Northern pike	35 (14)	53 (21)	71 (28)	86 (34)	112 (44)
Channel catfish	28 (11)	41 (16)	61 (24)	71 (28)	91 (36)
Black bullhead	15 (6)	23 (9)	30 (12)	38 (15)	46 (18)
Common carp	28 (11)	41 (16)	53 (21)	66 (26)	84 (33)
Bigmouth buffalo	28 (11)	41 (16)	53 (21)	66 (26)	84 (33)

For most fish, 30-60 or 40-70 are typical objective ranges for “balanced” populations. Values less than the objective range indicate a population dominated by small fish while values greater than the objective range indicate a population comprised mainly of large fish.

Relative weight (Wr) is a condition index that quantifies fish condition (i.e., how much does a fish weigh for its length). A Wr range of 90-100 is a typical objective for most fish species. When mean Wr values are well below 100 for a size group, problems may exist in food and feeding relationships. When mean Wr values are well above 100 for a size group, fish may not be making the best use of available prey.